

CLAIMS

What is claimed is:

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5         at least one processor capable of executing
6         instructions; .

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10 wherein the memory system stores

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14         instructions for limiting the number of commands
15         queued to a storage node of the at least one storage
16         node to the current queue depth associated with the
17         storage node, and

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1 2. The initiator node of Claim 1, wherein the
2 instructions for dynamically adjusting the current
3 queue depth include instructions for adjusting the
4 current queue depth associated with a storage node
5 downwardly when the current queue depth is greater

6 than a minimum queue depth and the storage node
7 refuses to queue a command issued by the initiator
8 node, and for adjusting the current queue depth
9 upwardly when the current queue depth is less than the
10 maximum queue depth associated with the storage node
11 and that storage node has not refused to queue any
12 commands issued by the initiator node for a determined
13 period of time.

1 3. The initiator node of Claim 2 wherein the
2 instructions for dynamically adjusting the current
3 queue depth include instructions for monitoring
4 logins, and for adjusting the current queue depth
5 downwardly when a login by an additional initiator
6 node is recognized.

1 4. In a storage area network node, a method of
2 controlling a maximum number of commands queued to a
3 storage node comprising the steps of:

4 maintaining a maximum queue depth associated with
5 the storage node and initializing the maximum queue
6 depth according to a type of the storage node;

7 maintaining a count of outstanding commands that
8 have been submitted to the storage node;

9 maintaining a current queue depth associated with
10 the storage node and initializing the current queue
11 depth to a value not less than a minimum queue depth
12 nor greater than the maximum queue depth;

13 holding commands for later submission to the
14 storage node if the count of commands that have been
15 submitted is greater or equal to the current queue
16 depth;

17 adjusting the current queue depth associated with
18 a storage node downwardly when the current queue depth
19 is greater than the minimum queue depth and the
20 storage node refuses to queue a command issued by the
21 initiator node; and

adjusting the current queue depth upwardly when the current queue depth is less than the maximum queue depth associated with the storage node and the storage node has not refused to queue any commands issued by the initiator node for a first predetermined period of time.

1 5. The method of Claim 4, further comprising the
2 step of adjusting the current queue depth associated
3 with the storage node downwardly is permitted to occur
4 no more than a predetermined number of times in a
5 second predetermined period of time.

1 6. The method of Claim 5, wherein the
2 predetermined number of times is one.

1 7. The method of Claim 5, wherein the first
2 predetermined period of time is adjusted dynamically.

1 8. The method of Claim 5, further comprising the
2 steps of:

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3         maintaining a second maximum queue depth
4         associated with a second storage node and initializing
5         the second maximum queue depth according to a type of
6         the second storage node;

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7 maintaining a second count of outstanding
8 commands, indicating commands that have been submitted
9 to the second storage node and have not completed; and

10 maintaining a second current queue depth
11 associated with the second storage node and
12 initializing the second current queue depth to a value
13 not less than a minimum queue depth nor greater than
14 the second maximum queue depth.

1 9. The method of Claim 5, wherein the step of
2 initializing the current queue depth initializes the
3 current queue depth to a value dependent upon a number
4 of initiator nodes known to be logged-in to the
5 storage area network.

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